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New Orleans, La.

PULPING AND NONPULPING CORDWOOD VOLUME IN SURVEY UNIT #2 GEORGIA

By

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* - This is an advance release of Forest Survey data that will be included in complete reports to be published later. This information is subject to correction or amplification as computations proceed.

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PULPING AND NONPULPING CORDWOOD VOLUME

IN SURVEY UNIT #2, GEORGIA

This report presents advance information on the wood supply in Georgia Survey Unit #2, an area of approximately 5,585,900 acres in the southwestern part of the State. Twenty-two counties, as indicated in figure 1, are wholly included in the Unit, the borders of which coincide with the Florida and Alabama state lines on the south and west. It is a rolling, well-drained country, of small urban and rural farm communities and extensive forest tracts. The average elevation above sea level ranges from less than 100 feet to approximately 400 feet, but no part, generally speaking, is markedly different from the rest. From a topographical standpoint, the Unit's most characteristic features are its successive series of gentle slopes and small streams. The principal rivers, all of which flow southward toward the Gulf, are the Chattahoochee, Ocmulgee, Little, and Flint.

The forest area can be divided into three major topographical classes: (1) The rolling uplands, which include approximately 59 percent of the total; (2) the swamps and bays, 22 percent; and (3) the flatwoods, 16 percent. The remaining 3 percent of the forest area is in bottomlands.

The entire Unit is exceptionally well equipped with transportation facilities. Among the numerous railroads which render all parts of it readily accessible are: The Atlantic Coast Line; Seaboard Airline; Southern; Georgia; Georgia Northern; Georgia and Florida; Southwestern and Gulf; and Atlanta, Birmingham, and Coast. In addition, more than half a dozen state or federal highways, interconnected at frequent intervals by graded or dirt county roads, form a more or less complete network throughout the Unit. Less than 5 percent of the total area is more than 5 miles from railroads, highways, or roads.

The estimates of land area and wood volume given in this report are based on data gathered from April to July 1934 by the Forest Survey, a part of the U.S. Forest Service and an activity of the Southern Forest Experiment Station. Three-man crews of specially trained timber estimators made the inventory by measuring the timber and recording the forest and land-use conditions on 6,911 one-quarter acre sample plots located at intervals of 600 feet on parallel compass lines 10 miles apart.

This release gives area and volume data which are preliminary and subject to correction and modification when final computations are completed; but such changes are not likely to be extensive or important.

In presenting this estimate of timber suitable for conversion into pulpwood, no consideration is given to the prior claims of other forest industries. The lumber industry of the future, for example, must depend largely upon the continual growth of young trees now below saw-timber size; hence too widespread a use for pulpwood of trees in the 6- to 14-inch diameter classes would jeopardize the future of the lumber industry. Therefore, before any planned expansion of the pulpwood industry in this Unit is undertaken, the needs of other industries must be taken into account. As soon as survey data covering the growth, drain, character, and economic aspects of the forest have been analyzed and interpreted, a basis will have been established for determining the volume of pulpwood, saw-timber, and naval-stores products that this Unit can perpetually produce. The Forest Survey plans to publish these findings later in a comprehensive, detailed report.

Land Area

Table 1 classifies the area by major land uses. More than 54 percent of the area is designated as forest land; nearly 44 percent as agricultural. The percentage of recently cleared or new cropland is noticeably less than that of idle and abandoned land.

TABLE 1. -- *Area classified by major land uses*

Land use classes	Area in acres	Percent of total area
Forest	3,020,400	54.1
Agricultural:		
In cultivation:		
Old cropland [1]	2,048,200	36.7
New cropland [2]	8,800	0.2
Out of cultivation:		
Idle [3]	207,700	3.7
Abandoned [4]	95,900	1.7
Improved pasture: [5]	63,100	1.1
Total agricultural	2,423,700	43.4
Other:		
Waterways	26,400	0.5
Towns and villages	50,300	0.9
Roads, railroads, etc.	65,100	1.1
Total other	141,800	2.5
Total area	5,585,900	100.0

[1] Land cultivated at least five years and on which a farm crop was raised within two years prior to the date of survey.

[2] Land recently converted from forest to cropland.

[3] Cultivated land which has been idle for two years or more, but which has not reached the abandoned stage.

[4] Land once cultivated but showing distinct evidence of having been abandoned for agricultural crop production; no attempt has been made to maintain it as improved pasture.

[5] Cleared land under fence used primarily for grazing; a real attempt has been made to produce and maintain a sod.

Under the system of sampling used in the collection of survey data, items which are of infrequent occurrence and relatively small in quantity cannot be determined with as high a degree of accuracy as is obtainable for items which occur more frequently and in substantially greater quantities. Small tabular figures, therefore, are to be taken as showing, not the exact magnitudes of the items involved, but their relative magnitudes in comparison with those of other items.

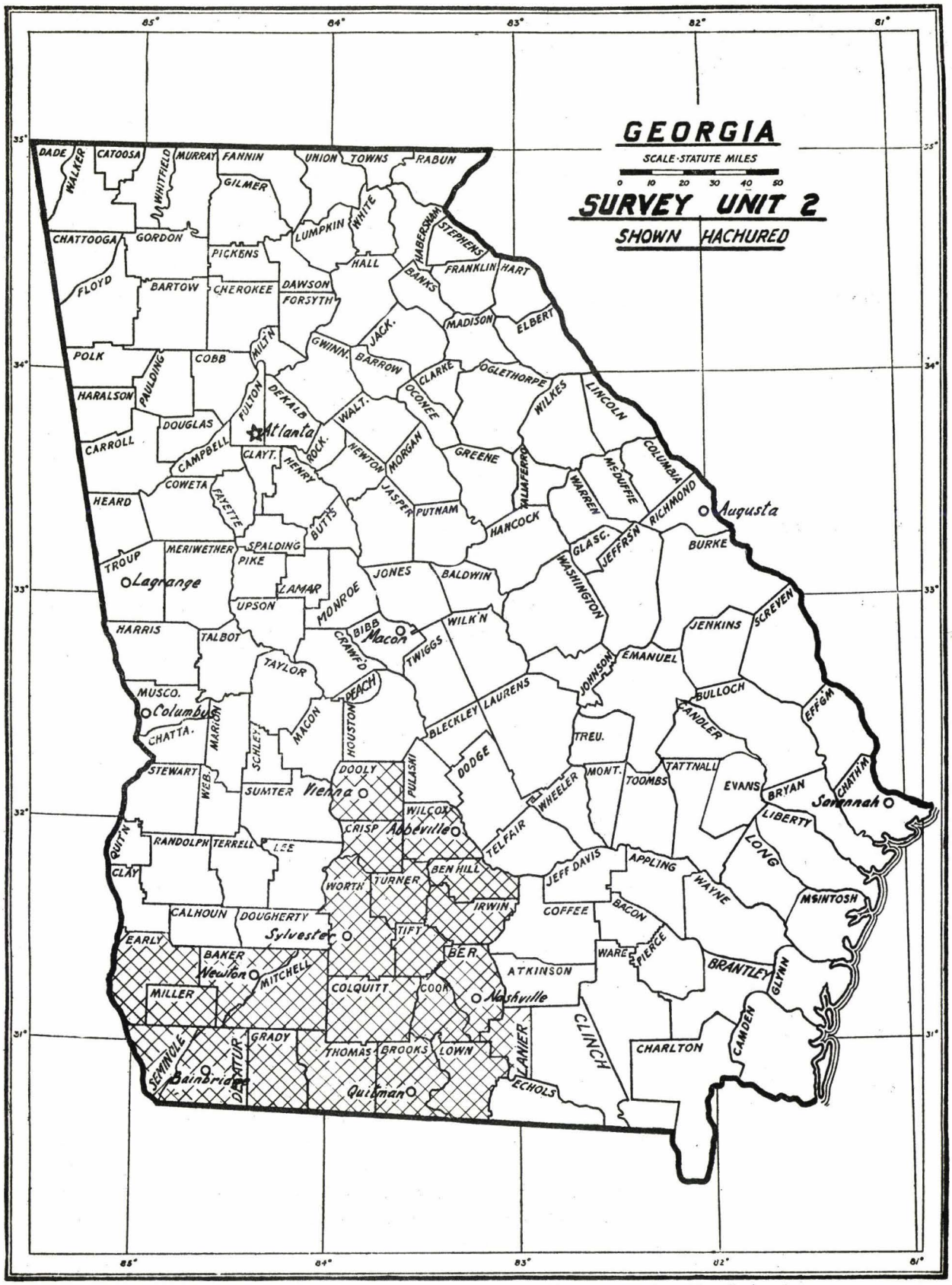

FIGURE 1. -- Geographical location of Survey Unit #2, Georgia.

Forest Area

The forest area of 3,020,400 acres is classified in table 2 by forest conditions and forest type groups. Forest conditions can be distinguished from one another by means of the following definitions:

Old-growth: Stands composed predominantly of saw-log-sized trees that have the characteristics of the original mature trees found in the region. ("Saw-log-sized" signifies a minimum diameter of 13.0 inches outside of bark at breast height in the hardwood species, or 9.0 inches in the pine species).

- **Uncut:** Old-growth stands from which less than 10 percent of the volume has been cut.
- **Partly-cut:** Old-growth stands from which 10 percent or more of the volume has been cut, but in which the remaining volume per acre in saw-log-sized trees is at the rate of at least 1,000 board feet of hardwood or hardwood and pine mixed, or 600 board feet of pine.

Second-growth: Stands that have succeeded the original old-growth as a result of forest cutting or other causes.

- **Saw-log size uncut:** Second-growth stands from which less than 10 percent of the saw-log-sized trees have been cut, and in which the volume per acre is at the rate of at least 600 board feet.
- **Saw-log size partly-cut:** Second-growth stands from which 10 percent or more of the saw-log-sized trees have been cut, but in which the remaining volume per acre is at the rate of at least 400 board feet.
- **Under saw-log size uncut:** Second-growth stands in which the volume per acre of saw-log-sized timber is at the rate of less than 600 board feet. Less than 10 percent of the trees under saw-log size have been cut.
- **Under saw-log size partly-cut:** Second-growth stands similar to the preceding, except that 10 percent or more of the trees under saw-log size have been cut.

Clear-cut: Cut-over stands in which the volume per acre in saw-log-sized trees is at the rate of less than 1000 board feet of hardwood or hardwood and pine mixed, or less than 600 board feet of pine; and in which an insufficient quantity of young growth has come in to classify the stands either as reproduction or as second-growth under saw-log size.

Reproduction: Areas of young-growth bearing seedlings less than 1 inch in diameter at the rate of at least 80 per acre.

Nearly 17 percent of the total forest area, or more than 500,000 acres, is in old-growth timber stands; more than 69% is in second growth. Clear-cut areas which have not yet reproduced make up 8.2 percent, and noncommodity 0.2 percent of the total.

TABLE 2. -- *Forest area by forest conditions and forest type groups*

Forest conditions	Forest type groups classified by predominant species			Total all types	Percent of total forest area
	Turpentine [1] pine	Nonturpentine pine	Hardwood		
	Acres				
Old-growth:					
Uncut	20,800	29,500	46,400	96,700	3.2
Partly-cut	245,300	51,800	109,500	406,600	13.5
Total	266,100	81,300	155,900	503,300	16.7
Second-growth:					
Saw-log size:					
Uncut	597,900	167,000	58,300	805,200	26.7
Partly-cut	87,800	32,800	12,800	133,400	4.4
Under saw-log size:					
Uncut	796,500	139,100	185,100	1,120,700	37.1
Partly-cut	20,000	5,600	7,200	32,800	1.1
Total	1,484,200	344,500	263,400	2,092,100	69.3
Clear-cut [2]	234,000	4,800	10,400	249,200	8.2
Reproduction	131,900	18,300	19,200	169,400	5.6
All area except noncommodity [3]	2,116,200	448,900	448,900	3,014,000	99.8 [4]
Percent of total forest area	70.0	14.9	14.9	99.8 [4]	

[1] Longleaf and slash pine.

[2] The area classified as clear-cut includes a relatively small amount of the fire-killed condition.

[3] Forest areas that do not have the qualities essential for the growth of commercial timber species; since these areas do not bear commercial timber species, they are therefore not included in the three major type groups.

[4] Exclusive of 0.2 percent of the forest area, or 6400 acres, in the noncommodity class.

Volume Estimates

The volume estimates are expressed in standard cords, 4x4x8 feet, measured with bark on, and include only the stemwood 4.0 inches or larger in diameter in all live, sound trees whose diameter at breast height is at least 5.0 inches outside of bark. The estimates therefore disregard altogether all trees less than 5.0 inches in

diameter at breast height, and exclude all stemwood less than 4.0 inches in diameter outside of bark, as well as all limbwood. An approximate deduction was made for woods cull--that part of the tree that would be left in the woods because of rot, fire-scar, crook, bad knots, or other defects. The volume of the entire butt sections (approximately 10 feet long) of working, resting, and worked-out turpentine trees was also omitted from the estimates; but later information may indicate that a substantial percentage of these butt sections can be used for pulpwood.

Georgia Survey Unit #2 is within the limits of the naval-stores belt, where the naval-stores industry maintains extensive operations. Accordingly, the pines are classified as turpentine and nonturpentine; turpentine pines are then further classified as round, working and idle, or worked out. These terms and species groups are defined as follows:

Turpentine pines (round):	Longleaf and slash pine trees that have never been worked for naval stores; that is, no cups have been hung nor faces made for the production of turpentine and rosin.
Turpentine pines (working and idle):	Longleaf and slash pine trees that either are being worked for naval stores at present, or are in a temporary period of rest.
Turpentine pines (worked-out):	Longleaf and slash pine trees on which as many faces have been worked as the trees will stand. These trees have served their purpose in the production of naval stores and are available for other uses.
Nonturpentine pines:	Loblolly, shortleaf, pond, sand, and spruce pines. These are not used in the production of naval stores.
Pulping hardwoods:	Hardwood species that can be used in the manufacture of paper. They include the gums, bays, maples, and magnolia, etc.
Nonpulping hardwoods:	Hardwood species that are not generally considered of value for the production of paper, such as oak, hickory, ash, cypress, etc.

Table 3 gives the total cordwood volume for the Unit, classified by the above species groups and by the three major forest type groups. Approximately 88 percent, or 16,640,000 cords, is in pulping species; only 12 percent, or 2,248,000 cords, is in nonpulping species. Nearly half the volume in pulping species, or 7,931,000 cords, is in round, working, and idle turpentine pines, trees which have not yet been worked out by the turpentine operators. The remaining 52 percent of the pulping volume, or 8,709,000 cords, is in the worked-out turpentine pines, the nonturpentine pines, and the pulping hardwoods. Loblolly is the outstanding species among the nonturpentine pines; black gum and red gum are the predominant species in the pulping hardwoods.

In the nonpulping hardwoods, which comprise approximately 12 percent of the total cordwood volume of the Unit, cypress, red oak, and white oak are the predominant species. These account for 38, 34, and 11 percent respectively, of the total of 2,248,000 cords.

TABLE 3. -- *Cordwood volume in pulping and nonpulping species groups by forest type groups*

Tree species groups	Forest type groups classified by predominant species			Total all types	Percent of total volume
	Turpentine pine	Nonturpentine pine	Hardwood		
	Thousands of cords[1]				
Pulping species:					
Turpentine pines:[2]					
Round	4,338	162	45	4,545	24.1
Working and idle	3,264	97	25	3,386	17.9
Worked-out	1,370	39	6	1,415	7.5
Nonturpentine pines[3]	633	3,215	113	3,961	21.0
Total pines	9,605	3,513	189	13,307	70.5
Hardwoods[4]	556	675	2,102	3,333	17.6
Total pulping	10,161	4,188	2,291	16,640	88.1
Nonpulping hardwoods[5]	472	416	1,360	2,248	11.9
Total all species	10,633	4,604	3,651	18,888	100.0
Percent of total volume	56.3	24.4	19.3	100.0	

[1] To convert to full number of cords add "000".
[2] Longleaf and slash pine.
[3] Loblolly, shortleaf, pond, sand, and spruce pine.
[4] Gum, maple, bay, magnolia, etc.
[5] Cypress, oak, hickory, ash, beech, elm, mulberry, dogwood, persimmon, etc.

No attempt is made here to estimate the proportion of standing timber which will presently be available for use as pulpwood. Among the factors governing such an estimate are the prior claims of established industries, the accessibility of the timber stands, and the provision for reproduction and growing stock for future cuts. It is reasonable to assume that because of the extensive turpentine operations in the Unit, a considerable number of the present round, and working and idle turpentine pines will not be available for pulp until they are fully worked out. Worked-out longleaf and slash pine species do not contribute heavily to the total cordage of the pulping species in this Unit; their aggregate, 1,415,000 cords, is only 7½ percent of the whole. However, owing to the fact that the naval-stores operators annually abandon working trees at a faster rate than they are absorbed by the lumber industry, the amount of pulpwood in the form of worked-out turpentine pines has increased each year.

Table 4 has therefore been prepared from the data given in table 3 in order to emphasize the volume of pulpwood in turpentine pines that have already been fully exploited by naval-stores operators, as well as the volume in species not used in naval-stores production.

TABLE 4. -- *Cordwood volume in worked-out turpentine pine, nonturpentine pine, and pulping hardwood species, by forest type groups*

Tree species groups	Forest type groups classified by predominant species			Total all types	Percent of total volume
	Turpentine pine	Nonturpentine pine	Hardwood		
	Thousands of cords[1]				
Worked-out turpentine pines[2]	1,370	39	6	1,415	16.2
Nonturpentine pines[3]	633	3,215	113	3,961	45.5
Total pines	2,003	3,254	119	5,376	61.7
Pulping hardwoods[4]	556	675	2,102	3,333	38.3
Total cordwood	2,559	3,929	2,221	8,709	100.0
Percent of total volume	29.4	45.1	25.5	100.0	

[1] To convert to full number of cords add "000".
[2] Longleaf and slash pine.
[3] Loblolly, shortleaf, pond, sand, and spruce pine.
[4] Gum, maple, bay, magnolia, etc.

The cordwood volume in worked-out and nonturpentine pines, and in pulping hardwoods, is shown by tree-diameter classes in table 5. Trees in the 6-, 8-, 10-, and 12-inch diameter classes comprise nearly 45 percent of the total cordage in the worked-out and nonturpentine pine species and nearly 49 percent of the total cordage in the pulping hardwoods. These young trees are not being utilized at present, but the extent to which they can be converted into pulpwood must necessarily be governed by the demand of other forest products industries. Worked-out turpentine trees in these diameter classes, which comprise 8.8 percent of the total cordwood volume, are usually slow of growth; but the reverse, ordinarily, is true of the nonturpentine pine and pulping hardwood trees in the same classes. Thrifty of growth and comprising 37.3 percent of the total cordwood volume, they thus serve as a nucleus for future timber crops on which the various wood-using industries must depend. Properly managed, particularly to the extent of periodical thinnings, these young stands will furnish an increasing supply of pulpwood and other forest products.

TABLE 5. -- *Cordwood volume in worked-out turpentine pine, nonturpentine pine, and pulping hardwood species, by tree diameter classes and forest type groups*

Tree species groups	Tree diameter classes [1]	Forest type groups classified by predominant species			Total all types	Percent of total volume
		Turpentine pine	Nonturpentine pine	Hardwood		
	Inches [2]	*Thousands of cords* [3]				
Worked-out turpentine pines [4]	6" - 8"	108	2	1	111	1.3
	10" - 12"	634	17	2	653	7.5
	14" - 18"	541	17	1	559	6.4
	20" & over	87	3	2	92	1.0
Total worked-out turpentine pines		1,370	39	6	1,415	16.2
Nonturpentine pines [5]	6" - 8"	109	450	19	578	6.6
	10" - 12"	206	818	30	1,054	12.1
	14" - 18"	247	1,105	29	1,381	15.9
	20" & over	71	842	35	948	10.9
Total nonturpentine pines		633	3,215	113	3,961	45.5
Pulping hardwoods [6]	6" - 8"	227	150	346	723	8.3
	10" - 12"	137	218	546	901	10.3
	14" - 18"	156	207	793	1,156	13.3
	20" & over	36	100	417	553	6.4
Total pulping hardwoods		556	675	2,102	3,333	38.3
Total		2,559	3,929	2,221	8,709	100.0
Percent of total volume		29.4	45.1	25.5	100.0	

[1] Nonturpentine pines and hardwoods were measured at 4 - 1/2 feet from the ground. Worked-out turpentine pines were measured above the turpentine-butt section, 10 feet from the ground.

[2] Trees ranging from 5.0" - 8.9" in diameter outside of bark are placed in the 6" - 8" class; corresponding limits apply to the other diameter classes.

[3] To convert to full number of cords add "000".

[4] Longleaf and slash pine.

[5] Loblolly, shortleaf, pond, sand, and spruce pine.

[6] Gum, maple, bay, magnolia, etc.

Table 6 gives the estimate of cordwood by forest type groups and tree diameter classes for the round, working and idle turpentine pines, and the nonpulping hardwoods. Taken together, tables 5 and 6 cover all the species groups, and show for each group the distribution of volume by tree diameter classes. Significant data from these tables are presented graphically in figure 2.

TABLE 6. -- *Cordwood volume in round, working and idle turpentine pine, in nonturpentine pine, and in nonpulping hardwood species, by tree diameter classes and forest type groups*

Tree species groups	Tree diameter classes [1]	Forest type groups classified by predominant species			Total all types	Percent of total volume
		Turpentine pine	Nonturpentine pine	Hardwood		
	Inches [2]	---------- *Thousands of cords* [3] ----------				
Turpentine pines: [4]						
Round	6" - 8"	2,168	50	16	2,234	21.9
	10" - 12"	1,382	54	16	1,452	14.3
	14" - 18"	620	44	13	677	6.6
	20" & over	168	14	-	182	1.8
Total		4,338	162	45	4,545	44.6
Working and idle	6" - 8"	521	12	3	53	65.3
	10" - 12"	1,845	54	12	1,911	18.8
	14" - 18"	820	28	7	855	8.4
	20" & over	78	3	3	84	.8
Total		3,264	97	25	3,386	33.3
Nonpulping hardwoods [5]	6" - 8"	184	87	311	582	5.7
	10" - 12"	146	95	392	633	6.2
	14" - 18"	103	140	373	616	6.1
	20" & over	39	94	284	417	4.1
Total		472	416	1,360	2,248	22.1
Total cordwood		8,074	675	1,430	10,179	100.0
Percent of total volume		79.3	6.6	14.1	100.0	

[1] Round turpentine pines, nonturpentine pines, and hardwoods were measured at 4-1/2 feet from the ground. Working and idle turpentine pines were measured above the turpentine-butt section, 10 feet from the ground.

[2] Trees ranging from 5.0" - 8.9" in diameter outside of bark are placed in the 6" - 8" class; corresponding limits apply to the other diameter classes.

[3] To convert to full number of cords add "000".

[4] Longleaf and slash pine.

[5] Cypress, oak, hickory, ash, beech, elm, mulberry, dogwood, persimmon, etc.

Table 7 classifies the cordwood volume for the average acre by species groups and tree diameter classes. This volume for the average acre is a theoretical figure derived by dividing the total volume for the Unit by the forest acreage, exclusive of the noncommodity class. The accompanying table shows that the average acre bears more than 6¼ cords of wood in all species. By far the greatest percentage of this

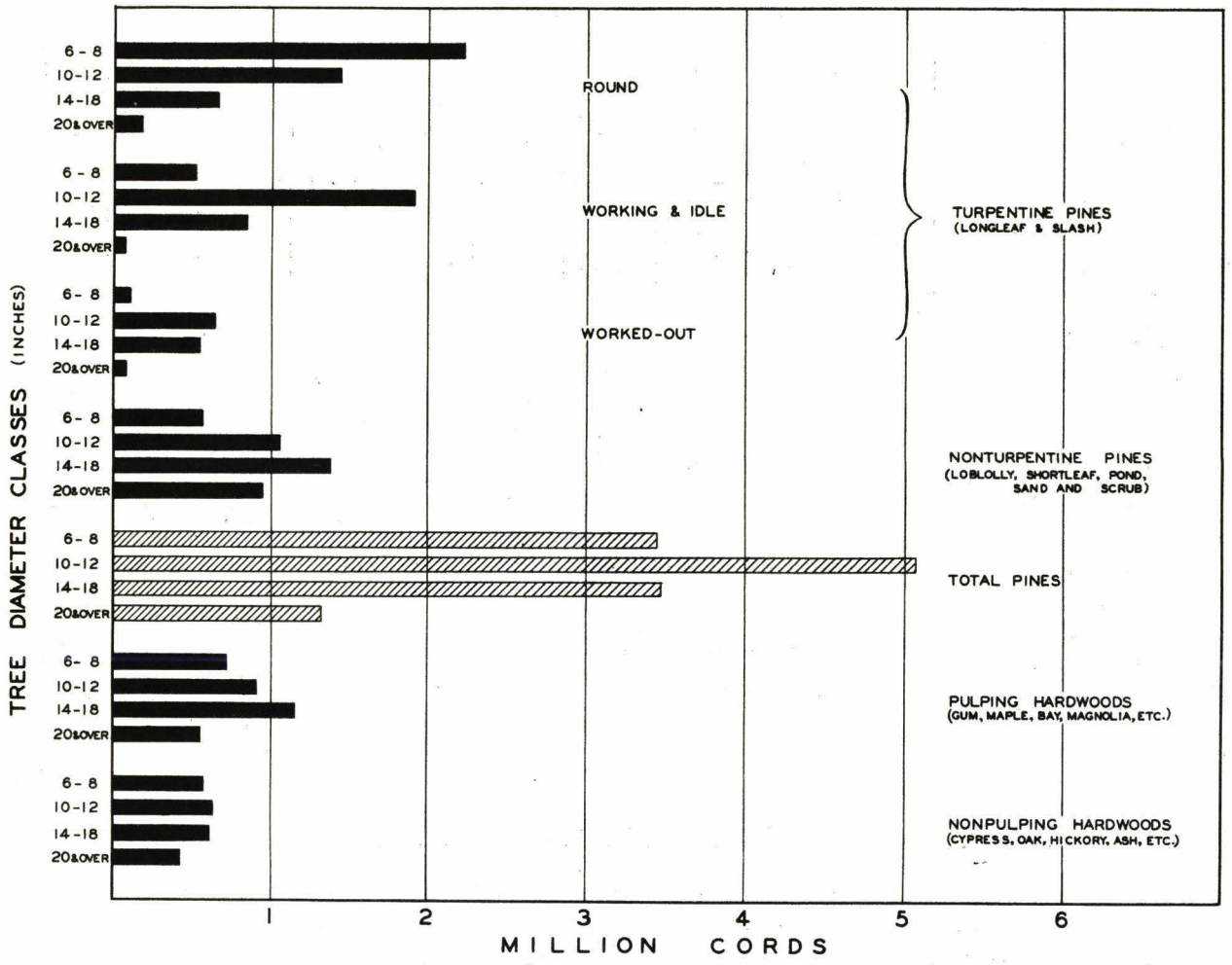

FIGURE 2. -- Classification of cordwood volume by species groups and tree diameter classes. Round turpentine pines, nonturpentine pines, and hardwoods were measured at 4-1/2 feet from the ground. Working and idle turpentine pines were measured above the turpentine-butt section, 10 feet from the ground. Trees ranging from 5.0" - 8.9" in diameter outside of bark are placed in the 6" - 8" class; corresponding limits apply to the other diameter classes.

quantity is in pulping species. Of the $5\frac{1}{2}$ cords of pulping species on the average acre, more than $2\frac{1}{2}$ cords, or approximately 42 percent of the total, are in round, and working and idle turpentine pines. For the immediate future this volume is presumably reserved for naval-stores utilization; following its exploitation by that industry, it will be available for other uses. Whether it will then be given over to the manufacture of pulp, lumber, or other forest products, will depend on the size and quality of the individual trees, and on the existing demand for each product. Considering all cordwood on the average acre, more than 60 percent of the volume is found in trees whose diameters range between 5.0 and 12.9 inches.

TABLE 7. -- *Cordwood volume on the average acre of forest land by pulping and nonpulping species groups and tree diameter classes* [1]

Tree species groups	Tree diameters in inches [2]								Total all diameter classes	
	6" - 8"		10" - 12"		14" - 18"		20" & over			
	Cords	% of total	Cords	% of total	Cords	% of total	Cords	% of total	Cords	% of total
Pulping:										
Turpentine pine: [3]										
Round	.74	11.8	.49	7.7	.22	3.6	.06	1.0	1.51	24.1
Working and idle	.18	2.9	.63	10.1	.28	4.5	.03	.4	1.12	17.9
Worked-out	.03	.5	.22	3.5	.19	3.0	.03	.5	.47	7.5
Nonturpentine pine [4]	.20	3.1	.35	5.6	.46	7.3	.31	5.0	1.32	21.0
Total pine	1.15	18.3	1.69	26.9	1.15	18.4	.43	6.9	4.42	70.5
Hardwood [5]	.24	3.8	.30	4.8	.38	6.1	.18	2.9	1.10	17.6
Total pulping	1.39	22.1	1.99	31.7	1.53	24.5	.61	9.8	5.52	88.1
Nonpulping hardwood [6]	.19	3.1	.21	3.3	.21	3.3	.14	2.2	.75	11.9
Total all species	1.58	25.2	2.20	35.0	1.74	27.8	.75	12.0	6.27	100.0

[1] The 3,014,000 acres of forest area bearing commercial timber species were used in finding the average acre.

[2] Round turpentine pines, nonturpentine pines, and hardwoods were measured at 4 - 1/2 feet from the ground. Working, idle, and worked-out turpentine pines were measured above the turpentine-butt section, 10 feet from the ground. Trees ranging from 5.0" - 8.9" in diameter outside of bark are placed in the 6" - 8" class; corresponding limits apply to the other diameter classes.

[3] Longleaf and slash pine.

[4] Loblolly, shortleaf, pond, sand, and spruce pine.

[5] Gum, maple, bay, magnolia, etc.

[6] Cypress, oak, hickory, ash, beech, elm, mulberry, dogwood, persimmon, etc.

Summary

Georgia Survey Unit #2 covers an area of nearly 5,586,000 acres, of which approximately 54 percent, or 3,020,400 acres, is forest land. Nearly 70 percent of the forest area is in second-growth stands. Eighty-eight percent of the total volume of cordwood, or nearly 17 million cords, is in pulping species; but almost half this amount (7,931,000 cords) is composed of round, and working and idle turpentine trees. The Unit is exceptionally well furnished with railroad lines and highways. No estimate can be given at present regarding the availability of the pulpwood supply because the growth rate and prior claims of other forest products industries have not as yet been established.